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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,107	05/03/2006	Motonori Yamamoto	12810-00192-US1	3025

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EXAMINER	
FANG, SHANE	

ART UNIT	PAPER NUMBER
1766	

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10/15/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,107	YAMAMOTO ET AL.	
	Examiner	Art Unit	
	SHANE FANG	1766	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,9-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

- The amendment of claim 1 is supported by specification 0114.
- The previous 103 rejections of claims 1-7 and 9-20 over Liu et al. in view of Warzelhan et al. have been overcome by amendment.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1-7 and 9-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Warzelhan et al. (US 6018004, listed on IDS) in view of Ohnishi et al. (US 20040152857, 102e date 01/04, different inventor and assignee).

As to claims 1-7 and 9-20, Warzelhan (abs., Ex. 14 and 16, 3:5-35, 5:1-40) discloses a biodegradable polymer blend of polyester and starch for producing molds. Warzelhan further teaches a blend of starch (about 9.4 parts about 32 wt.% by calculation and polyester (14 parts, about 48 wt.% by calculation) (Ex. 16). Warzelhan discloses biodegradable polyester as recited in claim 2 contains A)acid component comprising 30-70 mol% of adipic acid, 30-70 mol% terephthalic acid, 0-5 mol% of

sulfonated compound; B) C2-C6-alkanediol; C) HO-(-C(O)-G-O-)$_p$-H, wherein p=1-1500, G=-CH_2-, D) a component capable forming ester linkages.

Warzelhan fails to disclose the claimed additional component of the copolymer of glycidyl (meth)acrylate/styrene.

Ohnishi (abs., 0004, 0012-16, 0020, 0037-42, 0077, Table 1, Ex. 1-6, Table 2, and Table 3, 0084-90) discloses a biodegradable starch composition and a mold comprising thereof comprising modified starch (inherently having hydroxyl groups) cured with polyepoxide curing agent via reacting with the hydroxyl groups on modified starch to form an ester linkage at an optimal loading of polyepoxide to ensure sufficient biodegradability. Polyester polyol can also be used as a curing agent for the modified starch composition. The polyepoxide can be copolymer of glycidyl (meth)acrylate (out of 2 candidates) with styrene (out of 3 candidates) or other equivalent epoxy such as bisphenol type epoxy as the curing agent. Although many copolymer compositions are disclosed in the reference and therefore anticipation does not appear to be present, it has been held that the mere fact that a reference suggests a multitude of possible combinations does not in and of itself make any one of these combination less obvious (**Merck & Co. v. Biocraft Laboratories**, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir. 1989). In light of this, one having ordinary skill in the art would obviously recognize to select the copolymer of glycidyl (meth)acrylate/styrene in view of Ohnishi.

Ohnihsi further discloses the ratio of starch to curing agent such as epoxy (bisphenol diglycidyl ether, bisphenol type epoxy) can be 100:10 (Ex. 5-6). In light, it would have been obvious to one of ordinary skill in the art at the time of the invention to

have replaced bisphenol diglycidyl ether with the copolymer of glycidyl (meth)acrylate/styrene because of their equivalent functionality as curing agent. These conditions appear to equally apply to both productions using similar curing agent. This adaptation would have obviously yielded instantly claimed ratio (0.1-15%) of instant claim 1.

Thus, based on the blending ratios of both Warzelhan and Ohnishi, in order to ensure sufficient biodegradability of the composition, one of ordinary skill in the art would obviously recognize to use the ratio of composition as polyester/starch/ copolymer of glycidyl (meth)acrylate/styrene as 14/9.4/0.94 by parts (or 47.6/30/3 by wt%), meeting the claimed weight ratio of instant claims 1, 4-5, and 11-15.

Ohnishi further discloses the improved the properties such as composition's compatibility with solvent or water, durability of molds, etc. (0014).

Therefore, as to Claims 1-7 and 9-20, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the biodegradable resin composition disclosed by Warzelhan and further added the copolymer of glycidyl (meth)acrylate/styrene of Ohnishi, because the resultant resin mixture would yield sufficient biodegradation and improved durable mold due to the curing of the starch with the copolymer of glycidyl (meth)acrylate/styrene and composition's compatibility with solvent or water.

Particularly to claims 6 and 16-19, Warzelhan teaches a mixing/reaction process of making a blend of a polyester and a starch in absence of free radical initiator (Ex. 16). Ohnishi discloses mixing/reaction process of starch with copolymer of glycidyl

(meth)acrylate/styrene or its equivalent epoxy (0088-89, Table 3) in absence of free radical initiator. One of ordinary skill in the art at would obviously recognize to performance a one step mixing of all three components in absence of free radical initiator.

As to claims 7 and 20, Warzelhan and Ohnishi are silent on the sequence of mixing polyester, starch, and copolymer of glycidyl (meth)acrylate/styrene. However, selection of any order of mixing ingredients is prima facie obvious. In re **Gibson**, 39 F.2d 975, 5 USPQ 230 (CCPA 1930). In this particular case, the application fails to disclose benchmark of one-step mixing vs. selective sequential mixing as recited in claims 7 and 20. All examples in Table 1-3 of instant application shows the selective sequential mixing using melaic anhydride as component iii instead of the claimed copolymer of glycidyl (meth)acrylate/styrene. No examples of one-step mixing are disclosed.

Response to Arguments

Applicant's arguments with respect to claims 1-7 and 9-20 have been considered but are moot in view of the new ground(s) of rejection. All 103 previous rejections have been withdrawn.

The Declaration filed on 08/31/10 has been found insufficient to overcome the new ground(s) of rejection. The Declaration contains only one data point of a composition of claimed ratio (Joncryl, copolymer of glycidyl (meth)acrylate/styrene at 0.2 wt%) Unexpected results must be commensurate in scope with the claims.

However, claim 1 claims the claimed range of copolymer of glycidyl (meth)acrylate/styrene as 0.1-15 wt% . The applicant must show unexpected results over the entire claimed range to support unexpected results for the entire range. Therefore, Applicant should compare several compositions containing claimed components of A, B, and C in amounts at several data points over the claimed range to several compositions containing the same claimed components of A, B, and C in amounts at several data points outside of the claimed range, including data points close to and far from the claimed range. Furthermore, Ex. 2 and Ex. 1 (reference example, without Joncryl) in the Declaration use Ecoflex FBX 7011 as component i, a polyester comprising moiety of butanol, terephthalic acid, and adipic acid but the component% is unknown. Instant claim 1 requires component I to have at least 30-99 mol% of aliphatic diacid, 1-70 mol% of aromatic diacid, and equal mol% of diol, as recited in instant claim 2. In light of this, the examiner has found Ex. 1 and 2 in the Declaration are insufficient to show unexpected results, because the component% of component i is unknown and the resultant impact of component i to the biodegradability and maximum modulus is unknown.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANE FANG whose telephone number is (571)270-7378. The examiner can normally be reached on Mon.-Thurs. 8 a.m. to 6:30 p.m. EST.. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Sf

/RANDY GULAKOWSKI/
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